

Claims after this response:

1. (Currently Amended) An apparatus for threading a biopolymer through a nanopore, comprising:

(a) a first microfluidic channel having at least two electrodes for creating an electric field for creating electrophoretic movement of the biopolymer in a first direction;

(b) a nanopore in the wall of the first microfluidic channel; and

(c) a second microfluidic channel communicating with the first microfluidic channel by way of ~~the~~ the nanopore in the wall of the first microfluidic channel, the second microfluidic channel having a second set of electrodes for creating ~~a electrophetic~~ electrophoretic movement of the ~~biopolymer~~ biopolymer in a second direction;

wherein at least one of the electrodes of the second set of electrodes is located in the second microfluidic channel on the opposite side of the nanopore with respect to at least one other of the electrodes of the second set of electrodes.

2. (Currently Amended) An apparatus for threading a biopolymer through a nanopore, comprising:

(a) a substrate having a channel etched in a first surface thereof, a channel wall comprising a first surface of said substrate and a nanopore in the channel wall, said nanopore connecting said channel to a second surface of said substrate, the channel wall and nanopore being designed for receiving a biopolymer;

(b) means for moving the biopolymer toward the nanopore in a first direction; and

(c) means for threading the biopolymer through the nanopore in a second direction:

3. (Currently Amended) An apparatus for threading a biopolymer through a nanopore, comprising:

(a) a substrate having a channel etched in a first surface thereof, a channel wall comprising a first surface of said substrate and a nanopore in the channel wall, said nanopore connecting said channel to a second surface of said substrate, the channel wall and nanopore being designed for receiving a biopolymer;

(b) at least one set of electrodes disposed in said first channel for moving the biopolymer in a first direction past the nanopore; and

(c) at least one set of electrodes for moving the biopolymer in a second direction through the nanopore after the biopolymer has been moved past the nanopore.

4. (Original) An apparatus as recited in Claim 3, wherein the biopolymer comprises a polynucleotide.

5. (Currently Amended) ~~An apparatus as recited in Claim 4,~~ An apparatus for threading a biopolymer through a nanopore, comprising:

(a) a substrate having a channel wall and a nanopore in the channel wall, the channel wall and nanopore being designed for receiving a biopolymer;

(b) at least one set of electrodes for moving the biopolymer in a first direction past the nanopore; and

(c) at least one set of electrodes for moving the biopolymer in a second direction through the nanopore after the biopolymer has been moved past the nanopore, wherein the biopolymer comprises a polynucleotide, and

wherein the biopolymer comprises a leader molecule attached to the biopolymer for threading the biopolymer through the nanopore.

6. (Original) An apparatus as recited in Claim 5, wherein the leader molecule comprises at least one fluorophore.

7. (Original) An apparatus as recited in Claim 4, wherein the polynucleotide is double stranded.

8. (Original) An apparatus as recited in Claim 4, wherein the polynucleotide is selected from the group consisting of mRNA, DNA, double stranded DNA, double stranded RNA, tRNA and mDNA.

9. (Original) An apparatus as recited in Claim 3, further comprising a second channel communicating with the first channel by way of the nanopore.

10. (Currently Amended) An apparatus as recited in Claim 9, wherein the second channel is orthogonal to the first channel ~~wall~~.

11. (Original) An apparatus as recited in Claim 9, wherein the second channel is below the first channel wall.

12. (Currently Amended) An apparatus as recited in Claim 9, wherein the second channel ~~wall~~ is adjacent to the first channel wall.

13. (Original) An apparatus as recited in Claim 9, wherein the second channel is above the first channel wall.

14. (Original) An apparatus as recited in Claim 1, wherein the first channel diameter is from 1 to 10 micrometers.
15. (Currently Amended) An apparatus as recited in Claim 1, wherein the first channel wall through which the nanopore passes is from 1 to 10 micrometers in width.
16. (Currently Amended) A method of threading a biopolymer through a nanopore, comprising:
- (a) moving the biopolymer with a leader molecule past the nanopore in a first direction; and
 - (b) threading the biopolymer through the nanopore in a second direction,
- wherein the leader molecule draws the biopolymer through the nanopore under the influence of an electric field.
17. (Original) A method of threading a biopolymer through an apparatus as recited in Claim 1, comprising:
- (a) moving the biopolymer past the nanopore in a first direction; and
 - (b) threading the biopolymer through the nanopore in a second direction.
18. (Currently Amended) A method of moving a biopolymer having a leader molecule through a nanopore in a substrate, comprising:
- (a) applying a first ~~electrophoretic~~ electric field in a defined direction to move the leader molecule past the nanopore in the substrate until a portion of the biopolymer is adjacent to the nanopore; and
 - (b) applying a second electric field in a second direction to move the biopolymer in a second direction through the nanopore;
- wherein the leader molecule draws the biopolymer through the nanopore under the influence of the second electric field.

19. (Currently Amended) An apparatus as recited in Claim 96, wherein the apparatus is transparent so that light may be used to detect the fluorophore and its position in the first channel.
20. (Currently Amended) An apparatus as recited in Claim 96, wherein the apparatus is transparent so that light may be used to detect the fluorophore and its position in the second channel.
21. (New) A method as recited in Claim 18, wherein a central portion of the leader molecule enters the nanopore before the rest of the leader molecule, so that the leader molecule is drawn into the nanopore in a doubled configuration.